

REMARKS

Claims 8 and 11-14 remain pending in this application. Applicants respectfully request reconsideration and allowance of these claims for reasons that follow.

Claim Rejections – 35 U.S.C. § 103

The Office Action rejected claims 8 and 11-14 under 35 U.S.C. §103(a) as being unpatentable over Braden (US 5,965,785) in view of Vercammen (US 7,279,089 B2) in two separate rejections. Applicants respectfully submit that the inventions defined in claims 8 and 11-14 are patently distinguishable from the combined teachings of Braden and Vercammen for reasons that follow.

Independent claims 8 and 11 respectively define methods for preventing corrosion of metal in an atmospheric distillation column for petroleum refining process and for inhibiting formation of hydrogen chloride in a crude oil atmospheric distillation unit, which comprise “adding only the (β -hydroxyethyl) trimethylammonium hydroxide [i.e., choline] *to fluid containing water or the desalted crude oil . . . and preventing corrosion of the metal and formation of hydrogen chloride.*” Applicants respectfully submit that the combined teachings of Braden and Vercammen would not motivate or lead one of ordinary skill in the art to the presently claimed invention.

The teachings of Braden propose a method of inhibiting corrosion within an atmospheric pipestill by feeding a blend of amines into the pipestill. The method of Braden requires that caustic (NaOH) is injected into the downstream of the desalter. However, the use of caustic or caustic agent causes problems, such that the catalyst is poisoned. See, for example, Fig. 1 and column 4, lines 14-27 of Braden. Braden attempts to solve the problem associated with the use

of caustic or caustic agent by further adding a blend of amines to the pipestill. If the amines of Braden were replaced with the choline of Vercammen, the combined method still requires the addition of caustic (NaOH) or caustic agent into the downstream of the desalter.

Since the combined teachings of Braden and Vercammen require addition of caustic (NaOH) or caustic agent, Applicants respectfully submit that this combination of teachings cannot contemplate or suggest the presently claimed inventions which require adding only the (β -hydroxyethyl) trimethylammonium hydroxide [i.e., choline] *to fluid containing water or the desalted crude oil . . . and preventing corrosion of the metal and formation of hydrogen chloride.*” In other words, the presently claimed invention only adds choline to the fluid containing water (claim 8) or desalted crude oil (claim 11) to prevent corrosion of metal and formation of hydrogen chloride. The method of Applicants’ claims can inhibit corrosion without the use of caustic (NaOH) or caustic agent. Therefore, the presently claimed invention will not lead to deterioration of the catalyst even if the choline is added in excess (Spec. p. 13, ll. 9-16).

Since neither Braden nor Vercammen, either alone or in combination, propose a method of inhibiting corrosion without the use of caustic (NaOH) or caustic agent and only by adding choline to fluid containing water or the desalted crude oil and preventing corrosion of the metal and formation of hydrogen chloride, Applicants respectfully submit that the inventions defined in claims 8 and 11 are patently distinguishable from the combined teachings of Braden and Vercammen.

In the previous Amendment filed on September 7, 2010, Applicants made the following arguments, which are still believed to demonstrate the advantages and unexpected advantages of the presently claimed invention:

Applicants submit that the data in the Specification demonstrates the unexpected advantages of the inventions set forth in claims 8 and 11-16. Consider, for example, the data in Table 2 on page 32 of the Specification, which shows that the presently claimed quaternary ammonium compound (i.e., (β -hydroxyethyl) trimethylammonium hydroxide or choline) in the presently claimed method can neutralize boiler water efficiently with an unexpectedly smaller quantity of the compound when compared to other amines. The data in Table 3 on page 34 in the Specification demonstrates that the presently claimed quaternary ammonium compound (i.e., (β -hydroxyethyl) trimethylammonium hydroxide or choline) in the presently claimed method has an unexpectedly superior lower corrosion speed than ammonia and other amines. The data in table 5 on page 36 in the Specification demonstrates that the presently claimed quaternary ammonium compound (i.e., (β -hydroxyethyl) trimethylammonium hydroxide or choline) in the presently claimed method exhibits an unexpectedly superior hydrogen chloride formation inhibiting effect or hydrogen chloride neutralizing effect, while monoethanolamine or dimethylethanolamine exhibit no hydrogen chloride formation inhibiting effect or hydrogen chloride neutralizing effect.

Test Example 4 on page 39 and the chart in Fig. 3 of the Specification also demonstrate the unexpected advantages of the presently claimed invention. As shown therein, when the presently claimed quaternary ammonium compound is added to feed water, the magnesium chloride and the calcium chloride which cause hydrogen chloride formation are converted to a chlorine salt of the presently claimed quaternary ammonium compound. However, even though the chlorine salt of the presently claimed quaternary

ammonium compound is thermally decomposed, there is no formation of hydrogen chloride which causes the corrosion of metal. In this manner, Applicants respectfully submit that the presently claimed invention unexpectedly prevents secondary corrosion.

On pages 6 and 7 of the Office Action mailed November 17, 2010, the Examiner commented that taking into account the miscibility of the compounds tested in the Specification, it is not entirely surprising that cyclohexylamine (the only hydrophobic compound on the list) requires a much higher weight percent to be effective when mixing in water in view of its much lower water solubility. Applicants respectfully submit that this argument and any other arguments diminishing the unexpected showing in the Specification are based on speculation and unsupported by scientific reasoning, and therefore should be withdrawn unless substantiated. In any event, the above-discussed data in the Specification demonstrates that the results based on the use of different amines in the methods of the presently claimed invention or related methods are unpredictable. Therefore, those skilled in the art would not expect that the substitution of one amine for another amine or mixture of amines, such as that of Vercammen, in the process of Braden would have any reasonable expectation of success. This is especially true, because Braden teaches that the particular blend of amines defined therein are necessary as opposed to the use of single amines or other blends of amines in the prior art (Braden col. 5, ll. 59-67; col. 7, ll. 15-39).

At least for these reasons, Applicants respectfully submit that the inventions defined in claims 8 and 11-14 are patently distinguishable from Braden and Vercammen within the meaning of 35 U.S.C. §103. Therefore, Applicants respectfully request that the Examiner reconsider and withdraw all rejections of Applicants' claims over these teachings.

Conclusion

In view of the foregoing, Applicants submit that this application is in condition for allowance. A timely notice to that effect is respectfully requested. If questions relating to patentability remain, the Examiner is invited to contact the undersigned by telephone.

No other fees are believed to be due. However, if any other fees are in fact due or if there are any problems with the payment of fees, please charge any underpayments and credit any overpayments to Deposit Account No. 50-1147.

Respectfully submitted,

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